

DIPTERA FROM NEPAL

PIPUNCULIDAE (DORILAIIDAE)¹

By D. ELMO HARDY

SYNOPSIS

Only eleven specimens of Pipunculidae were collected by the British Museum (Natural History) expedition to East Nepal, 1961-62. These represent five species in two genera and two subgenera. One of the species may be named, but four appear to be undescribed.

No information is available on the species which occur in this region. Brunetti (1912, 1915 and 1923) described a number of species from northern India but had no records from Nepal. His descriptions are very inadequate and until his types can be restudied it will be impossible to deal with most of his species. It is of interest to note that one of the species, *Pipunculus distocruciator* n. sp., is known to be an important parasite of the rice leafhopper, *Nephotettix cincticeps*, in Japan. (Refer to Koizumi, 1959 : 42 and 1960 : 40—under “*cruciator*”).

I am grateful to R. L. Coe and the British Museum (Natural History) for the privilege of studying this interesting material. I am appreciative of the cooperation I have received from Drs. K. Koizumi, A. Nagatomi, and K. Yasumatsu in lending me specimens from Japan for study. For the art work, I am indebted to Miss Noreen Naughton, University of Hawaii.

The two genera which are known from Nepal are readily differentiated by the presence of a stigma, or dark marking, in the subcostal cell in *Pipunculus* (Text-fig. 14), and by the lack of a stigma in *Tomosvaryella* (Text-fig. 20). The subgenus *Eudorylas* is differentiated from typical *Pipunculus* by lacking a fan of hairs on each propleuron.

KEY TO KNOWN GENERA AND SPECIES OF PIPUNCULIDAE FROM NEPAL

- 1 Stigma present in third costal section (subcostal cell) (Text-fig. 11) 2
- Stigma lacking; wing venation as in Text-fig. 20 and male genitalia and hind trochanter of male as in Text-figs. 21 and 22 *Tomosvaryella nitens* (Brunetti)?
- 2 Propleural fan present *PIPUNCULUS (PIPUNCULUS)* 3
- Propleural fan absent *PIPUNCULUS (EUDORYLAS)* 4
- 3 Male hypopygium with a prominent projection from the apex (Text-fig. 17). Femora predominantly black *exsertus* sp. n.
- Hypopygium lacking such a development (Text-fig. 12). Femora yellow *demitens* sp. n.
- 4 Third antennal segment acute (Text-fig. 1). Male hypopygium with an apical membranous area and with a membranous protrusion from the apex (Text-figs. 2 and 3) *discors* sp. n.
- Third antennal segment acuminate (Text-fig. 4). Male hypopygium with a prominent cleft extending longitudinally down the right side (Text-fig. 6) *distocruciator* sp. n.

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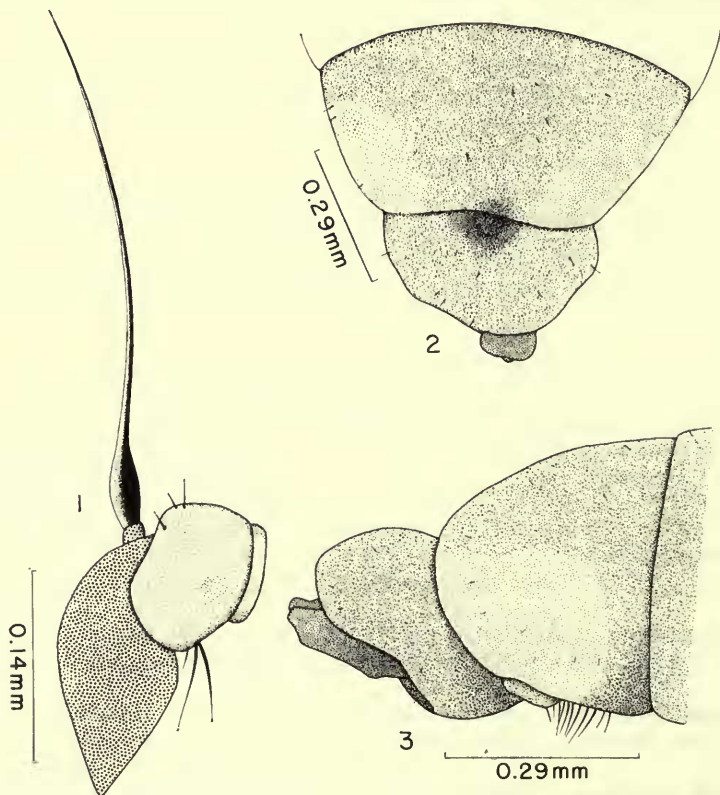
Bull. Brit. Mus. (nat. Hist.), Ent. 17 (10) 1966.

Pipunculus (Eudorylas) discors sp. n.

(Text-figs. 1-3)

In Brunetti's key (1923:6) this would run to *P. campestris* var. *himalayensis* Brunetti. I have not seen specimens of Brunetti's "variety" but he said that the two specimens he had before him "varied so little from typical *P. campestris*, which is one of the commonest European species, having a wide distribution and therefore likely to occur in the Himalayas, that it seems impossible to regard them as other than a variety. The length of the arista being only twice instead of thrice the length of the antenna, the absence of any shiny black segment in the abdomen and the almost bare thorax are the only differences." Brunetti's reference is to *campestris* Verrall, 1901, *British Flies* 8: 99-103, not *campestris* Latreille. Verrall's *campestris* is a synonym of *P. ater* Meigen. (Refer to Hardy, 1943:74.) *P. discors* is not related to *ater*; the two belong in different subgenera. This does not appear to fit near any of the Palaearctic species treated by Sack (1935).

♂ *Head*: The eyes are joined on the front for a distance about equal to the length of the frontal triangle. The lower portion of the front is entirely silvery grey pubescent. The face is silvery grey, equal in width to the lower portion of the front. The antennae are brown to black,



FIGS. 1-3. *Pipunculus (Eudorylas) discors* sp. n. 1. antenna; 2. ♂ genitalia, dorsal; 3. ♂ genitalia, lateral.

the third segment is acute (Text-fig. 1). *Thorax* : Shining black in ground colour, brownish pollinose on the dorsum, grey on the sides. The humeri are brown to black, covered with grey pollen. The mesonotum is almost bare, with inconspicuous setae along the dorsocentral rows and along the sides. The scutellum has short, inconspicuous setae along the margin. The halteres are brown to black except for the yellow stems. *Legs* : Almost entirely brown to black, yellow on the extreme apices of the femora and tibiae, and broadly yellow on the bases of the tibiae. The tarsi are yellow, tinged with brown especially on the apical segments. The trochanters are yellow, tinged with brown, the hind pair is clear yellow ventrally. The hind tibia has no prominent erect setae on the outside surface. Moderately developed ventral spines are present on all of the femora. *Wings* : Subhyaline, with the brown stigma filling all of the third costal section. The third costal section is slightly longer than the fourth and the two sections combined are approximately equal in length to the fifth section. The *r-m* crossvein is situated near the basal third of cell 1st M_2 and the last section of vein M_{1+2} is slightly curved. The last section of vein M_{1+2} is about equal in length to the *m* cross-vein. *Abdomen* : Rather broad and short, rounded on the sides, about 1/3 longer than wide (including the hypopygium), the proportion of the length to the width is 94 to 66. The abdomen is predominantly brown pollinose, the sides are grey and the shining black ground colour shows through down the medium portion of the dorsum. The first tergum has two short, black bristles on each side. The hypopygium is approximately 3/4 as long as the fifth abdominal segment and the entire apical portion is covered by a large membranous area ; this is visible only from ventral or lateral views (Text-fig. 3). As seen from a dorsal view, a prominent protrusion is visible at the upper portion of the membranous area (Text-fig. 2). As seen from above, the eighth segment has a depressed area in the middle near the base. The seventh segment is not visible from a dorsal view. The ventral aspects of the genitalia have not been studied.

Length : Body, 2.75 mm. ; wings 3.5 mm.

♀ unknown.

Holotype ♂. E. NEPAL : Tumlingtar, bare, rocky slopes above R. Sabhaya, w. bank, c. 1,900 ft, 8-24. xii. 1961 (R. L. Coe).

Type in the British Museum (Natural History).

***Pipunculus (Eudorylas) distocruciator* sp. n.**

(Text-figs. 4-7)

Pipunculus (Eudorylas) cruciator Koizumi, nec Perkins, 1959, *Sci. Reports Fac. Agric. Okayama Univ.* **13** : 41. **syn. n.**

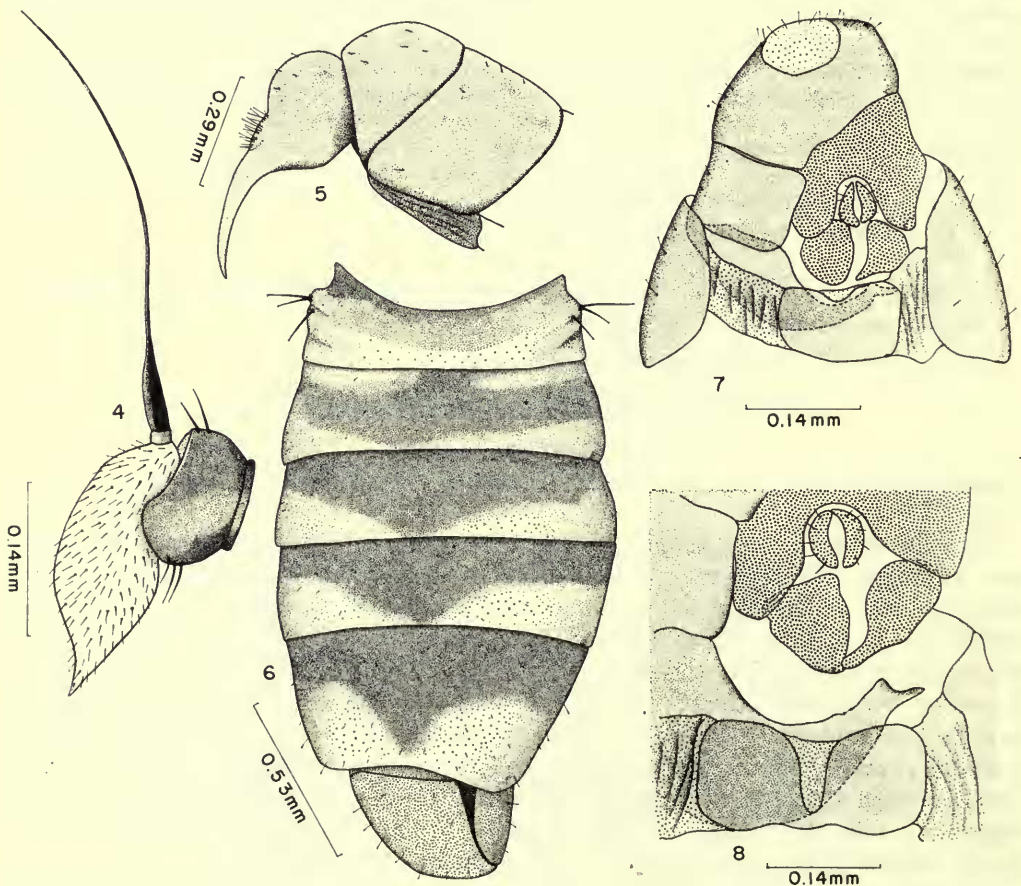
This species is closely related to *P. cruciator* and from external characters I see no way to differentiate the two. The ventral aspects of the male genitalia, however, appear to differ ; the shapes of the inner clasper and the fifth sternum show consistent differences in the specimens which I have studied from Australia (*cruciator*) and those from Japan and Nepal. I suspect that the record of "*cruciator*" from Koshun, Formosa, by Kertész (1912 : 297) should pertain to *distocruciator*. *P. distocruciator* is differentiated from *cruciator* by having the inner clasper of the male short, broadly rounded (Text-fig. 7), rather than longer than wide, attenuated apically (Text-fig. 8). Also the fifth sternum (note, this was referred to as the sixth sternum by Hardy, 1964 : 99) is deeply cleft in *cruciator* (Text-fig. 8) and with but a shallow depression in the middle of the hind margin in *distocruciator* (Text-fig. 7).

♂. Fitting the description of *cruciator* Perkins except for the characters noted above (refer to the descriptions by Hardy, 1964 : 98). The excellent description and figures of Koizumi (1959 : 41) pertain to *distocruciator*.

The following notes deal only with the diagnostic characters.

Head: The antennae are short acuminate (Text-fig. 4). The third segment varies in colour from brown, tinged lightly with yellow to yellow with but a faint tinge of brown. *Thorax*: Shining black in ground colour, densely grey-brown pollinose over the dorsum, grey on the metanotum, pleura, and the anterior corners of the mesonotum. The humeri are yellow. *Legs*: The femora are black except for the yellow bases and apices. The legs are otherwise yellow except for the black coxae and brown to black apices of the tarsi. *Wings*: Hyaline except for the brown stigma which fills all of the third costal section. The third costal section is approximately equal in length to the fourth and the *r-m* cross-vein is situated near the basal third of cell 1st M_2 . *Abdomen*: Rather broad, rounded on the sides, slightly over one-third longer than wide. Entirely opaque, brown at the bases of the terga, grey apically (Text-fig. 6). The prominent cleft extending longitudinally down the right side of the hypopygium is characteristic of the *cruciator* complex (Text-fig. 6). The distinguishing features of the genitalia have been noted above (refer to Text-figs. 7 and 8).

Length: body, 3.5–3.7 mm.; wings, 4.75 mm.



FIGS. 4–8. *Pipunculus (Eudorylas) distocruciator* sp. n. (4–7) and *P. (E.) cruciator* Perkins (8). 4. antenna; 5. ♀ ovipositor; 6. abdomen of ♂, dorsal; 7. ♂ genitalia, ventral. 8. *P. cruciator*, ♂ genitalia, ventral.

♀. Fitting the description of the male except for secondary sexual characters, also the third antennal segment is clear yellow and slightly longer acuminate. The front is entirely grey pollinose. The grey marking on the sides and anterior margins of the terga are broadly interrupted with brown medianly. The ovipositor is shaped as in Text-fig. 5.

Length : approximately the same as for the male. One undersized specimen measures 2.5 mm. for the body and 3.5 mm. for the wings.

The characters of the puparium are the same as for *cruciator* (refer to Hardy, 1964 : 99).

Holotype ♂. E. NEPAL : Taplejung Distr., Sangu, c. 6,200 ft, mixed vegetation by stream in gully, xi.1961-i.1962 (R. L. Coe). B.M.

Allotype ♀ and two paratypes, 1 ♂, 1 ♀, same data as type except that they were collected ix-x.1961. Also 1 ♀, same district and collector as type, between Sangu and Tamrang, c. 5,200 ft, mixed plants by damp cliff in deep river gorge, 22.xi.1961.

Type, allotype and two paratypes in the British Museum (Nat. Hist.). One paratype has been retained at the University of Hawaii.

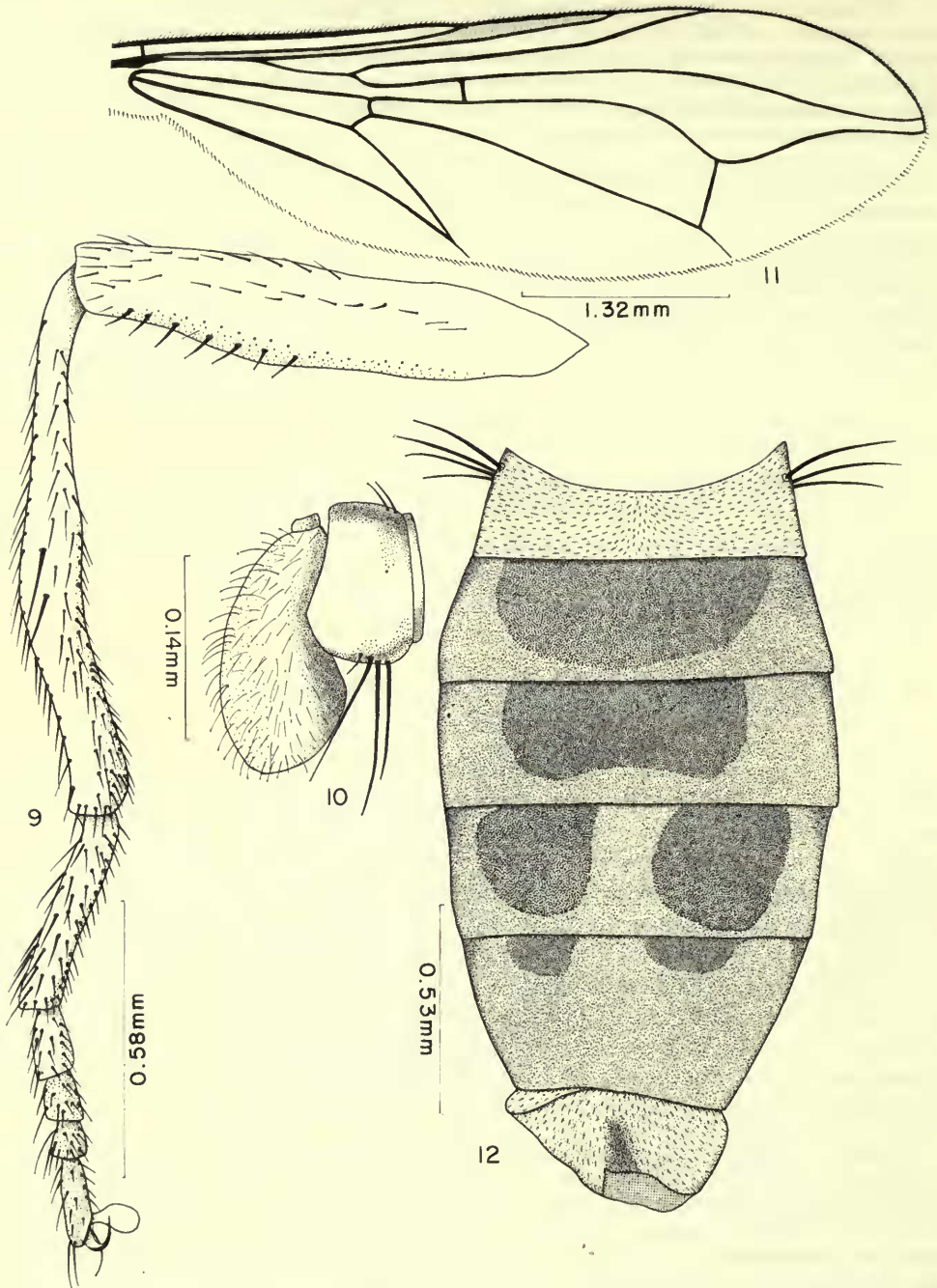
A series of specimens from Kyoto and Okayama, Japan, were borrowed from Kenji Koizumi through A. Nagatomi and K. Yasumatsu. This species is apparently common in rice fields in Japan and has been reared from the Green Rice Leafhopper, *Nephotettix cincticeps* Uhler (refer to Koizumi, 1959 : 42 and 1960 : 40). The specimens from Japan are not being indicated as paratypes.

***Pipunculus (Pipunculus) deminitens* sp. n.**

(Text-figs. 9-12)

This species runs near *P. nigronitens* Brunetti in Brunetti's key to the Indian species (1923 : 6) but his descriptions are so sketchy that many of the important diagnostic features are left out and it is probable that these two species are not actually related. Brunetti's type has not been re-examined, but based upon his original description *deminitens* would differ from *nigronitens* by having the humeri clear yellow, not brownish yellow ; by having the abdomen opaque black over the dorsum of terga two-four, rather than entirely shining black, except for the grey pollinose first tergum ; also the *r-m* cross-vein of *deminitens* is situated slightly before the basal fourth of cell 1st M_2 , rather than just before the basal one-third as in *nigronitens* ; and the body measures 4.0 mm. rather than 3.0 mm. The resemblance of these two is probably superficial and since Brunetti gives no information on genital characters, it is not possible to compare the actual relationships.

♂. *Head* : The compound eyes are joined on the front for a distance about equal in length to the lower portion of the front. The lower front and the face are grey pubescent, the face is approximately equal in width to the front just above the antennae. The antennae are entirely black, the third segment is short, rounded at the apex (Text-fig. 10). The ventral setae of the second antennal segment extend well beyond the apex of the third segment. *Thorax* : Polished black in ground colour, except for the yellow humeri ; rather lightly brown pollinose over the dorsum, grey pollinose along the lateral margins of the mesonotum, and with a conspicuous silvery grey spot on each side of the front margin of the mesonotum just inside each humerus. The



FIGS. 9-12. *Pipunculus (Pipunculus) deminitens* sp. n. 9. hind leg; 10. antenna; 11. wing; 12. ♂ abdomen, dorsal.

mesonotum is bare except for short, inconspicuous setae down each dorsocentral row and for setae along the lateral margins. The scutellum has a row of short, rather inconspicuous setae around the hind margin. The pleura and the metanotum are grey pollinose. The stems of the halteres are yellow, the knobs are yellow, tinged with brown. *Legs*: Predominantly yellow, the coxae are black and the tarsi are tinged with brown to black on the apical segments. The trochanters are yellow, tinged with brown. The hind femur is rather slender, and has a row of prominent anteroventral setae extending over the apical half of the segment and a row of rather small anterodorsal setae extending almost the full length of the segment. The posteroventral surface of the hind femur has four black setae at about the apical fourth of the segment and a line of yellow hairs continuing to the base of the segment. Prominent black setae are present on the anteroventral and posteroventral surfaces of the middle tibia, these extend over the apical three-fifths of the segment on the anteroventral surface and over the apical three-fourths to four-fifths on the posteroventral surface. Moderately long, conspicuous cilia are present on the posterodorsal surface of the middle femur. The hind tibia is thickened medianly, attenuated at the base, and rather distinctly curved. Two prominent, erect anterior setae are present at the middle of the hind tibia (Text-fig. 9). The hind basitarsus is about equal in length to the next three tarsal segments. *Wings*: Entirely hyaline except for the grey-brown stigma. The third costal section is two times longer than the fourth and the two sections combined are slightly longer than the fifth costal section. The *r-m* cross-vein is situated near the basal fourth of cell 1st M_2 and the last section of vein M_{1+2} is rather strongly curved (Text-fig. 11). *Abdomen*: The sides are gently rounded, the abdomen is broadest at the junction of segments three and four. The first tergum is entirely grey pollinose. Three to four prominent black bristles, plus several short setae are present in a row on each side of the first tergum. The abdomen is rather sparsely covered with short, brown to black setae and is polished black, except for velvety black markings on terga two-five. Terga two and three each have a large opaque black spot covering the anteromedian area, extending laterally over approximately two-thirds of the segment and posteriorly almost to the hind margin of the segment. Tergum four has a moderately large, opaque black spot on each side of the mid-line and tergum five has a rather small opaque black spot on each side (Text-fig. 12). As seen from direct dorsal view the hypopygium is approximately two-thirds as long as the fifth abdominal segment, compressed to the right and with a moderately large membranous area present at the apex of the eighth segment (Text-fig. 12). The ventral aspects have not been studied.

Length: Body, 4.0 mm.; wings, 5.5 mm.

♀. Unknown.

Holotype ♂. E. NEPAL: Taplejung Distr., damp evergreen oak forest above Sangu, c. 10,400 ft, 2-26.xi.1961 (R. L. Coe).

Type in the British Museum (Natural History).

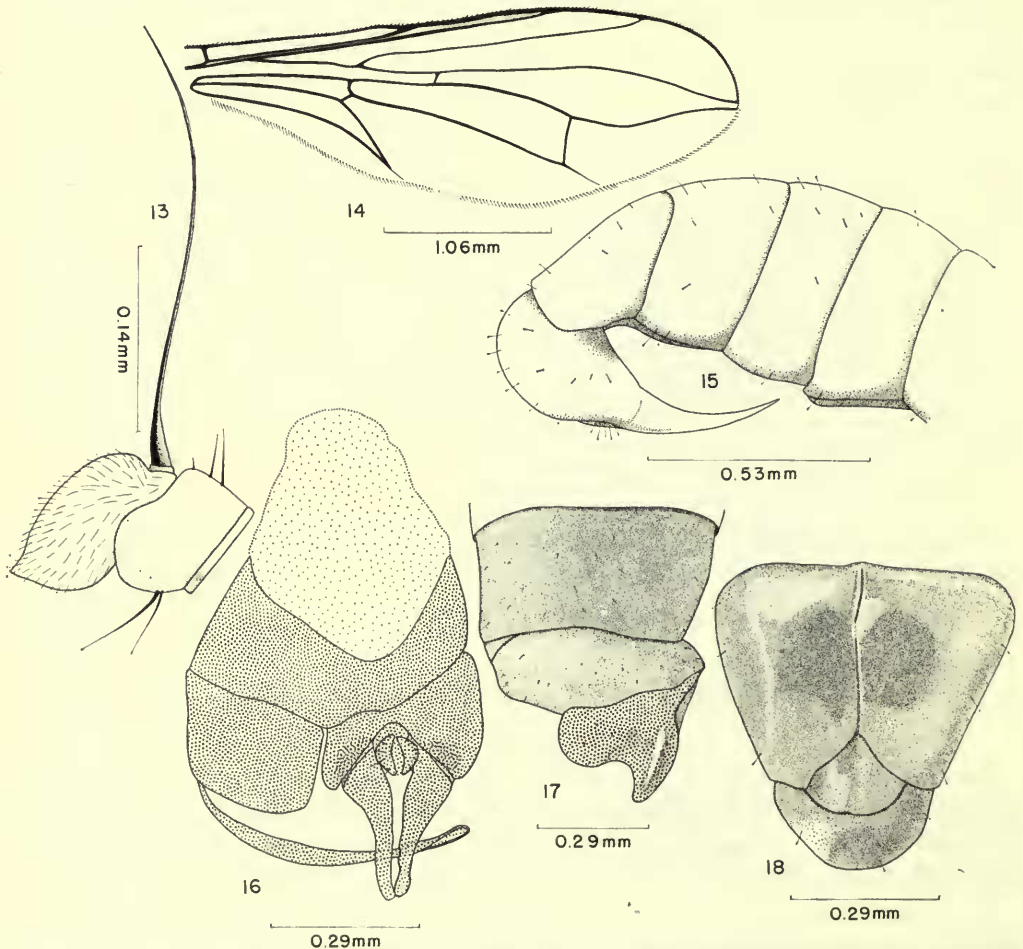
Pipunculus (Pipunculus) exsertus sp. n.

(Text-figs. 13-18)

In Brunetti's key (1923: 6) this species runs near *transversus* Brunetti and *uniformis* Brunetti but both of these belong in the subgenus *Eudorylas* and *exsertus* is not related. The genitalia are strikingly different and the prominent extension of the membranous area will readily differentiate this species from any known from the Orient.

♂. *Head*: The head is approximately as high as long, the compound eyes are joined on the front for a distance approximately equal in length to the frontal triangle. The frontal triangle is dull black pubescent except for a small polished black spot in the median portion. The face is grey pollinose, at its narrowest point it is scarcely more than one-half as wide as the front

above the antennae. The antennae are brown to black, covered with grey pubescence, the third segment is short acute (Text-fig. 13). *Thorax*: Shining black in ground colour, grey on the sides and grey-brown pollinose dorsally. The humeri are brown to black, tinged with yellow. The propleural fan is made up of several pale, inconspicuous hairs. The mesonotum is bare except for short setae down the dorsocentral rows and on the lateral margins. The scutellum has about eight short, pale setae around the hind margin. The halteres are yellow, except for the brown bases. *Legs*: The coxae are black, covered with grey pollen, the femora are dark brown to black, except for narrow yellow apices and bases. The trochanters are yellow, the tibiae are yellow, except for a tinge of brown medianly. The tarsi are yellow, except for the brown apical segments. Ventral spines are present on the middle and hind femora but these are not strongly developed. No prominent erect setae are present on the outside surface of the hind tibia. *Wings*: Entirely hyaline, except for the brown stigma. The stigma fills about the apical four-fifths of the third costal section. The third section is about one-third longer than the fourth and is just slightly longer than the fifth costal section. The *r-m* cross-vein is located at



FIGS. 13-18. *Pipunculus (Pipunculus) exsertus* sp. n. 13. antenna; 14. wing; 15. ♀ abdomen, lateral; 16. ♂ genitalia, ventral; 17. ♂ genitalia, dorsal; 18. apex of ♀ abdomen, dorsal.

the basal third of cell 1st M_2 and the last section of vein M_{1+2} is gently curved (Text-fig. 14). *Abdomen* : Rather narrow, almost straight-sided. The first four terga are opaque brown, the fifth is blue-black in ground colour, lightly grey-brown pollinose, opaque brown only on the anterolateral margins. The fifth segment is approximately one-half longer than the fourth. The sclerotized portion of the genitalia is shining black in ground colour, covered with grey-brown pollen; the membranous portion is opaque brown. As seen from a dorsal view the hypopygium is distinctly longer than the fifth abdominal segment and the membranous portion is extended into a prominent projection as in Text-fig. 17. As seen from ventral view, the large membranous area covers the entire apex of the hypopygium. The claspers are long, slender and straight-sided, as in Text-fig. 16.

Length : Body, 2.8–3.0 mm. ; wings, 3.7–3.9 mm.

♀. Fitting the description of the male in most respects. The front is broad, entirely grey pollinose and four to five times wider than the narrowest portion of the face. The abdomen is straight-sided, the first two segments are entirely grey pollinose, the third and fourth terga are brown dorsally, grey on the sides and terga five and six are subshining black, lightly grey-brown pollinose. Terga three and four are yellow in ground colour on the lateral and ventral margins. The fifth abdominal segment is approximately one-third longer than the fourth and the sixth segment is one-fourth longer than the fifth. As seen from dorsal view the sixth segment is split in the middle of the posterior margin and a longitudinal groove extends the full length of the segment (Text-fig. 18). The ovipositor is short and curved, and extends approximately to the base of the fourth abdominal segment (Text-fig. 15).

Length : Body, 3.2 mm. ; wings, 4.0 mm.

Holotype ♂. E. NEPAL : Taplejung Distr., between Sangu and Tamrang, mixed plants by damp cliff in deep river gorge, c. 5,200 ft, 22.xi.1961 (R. L. Coe).

Allotype ♀ and one paratype ♂, same data as type, except collected in mixed shrubs in deep gorge, x–xi.1961.

Type and allotype in the British Museum (Natural History). Paratype in the collection of the University of Hawaii.

Tomosvaryella nitens (Brunetti)?

(Text-figs. 19–22)

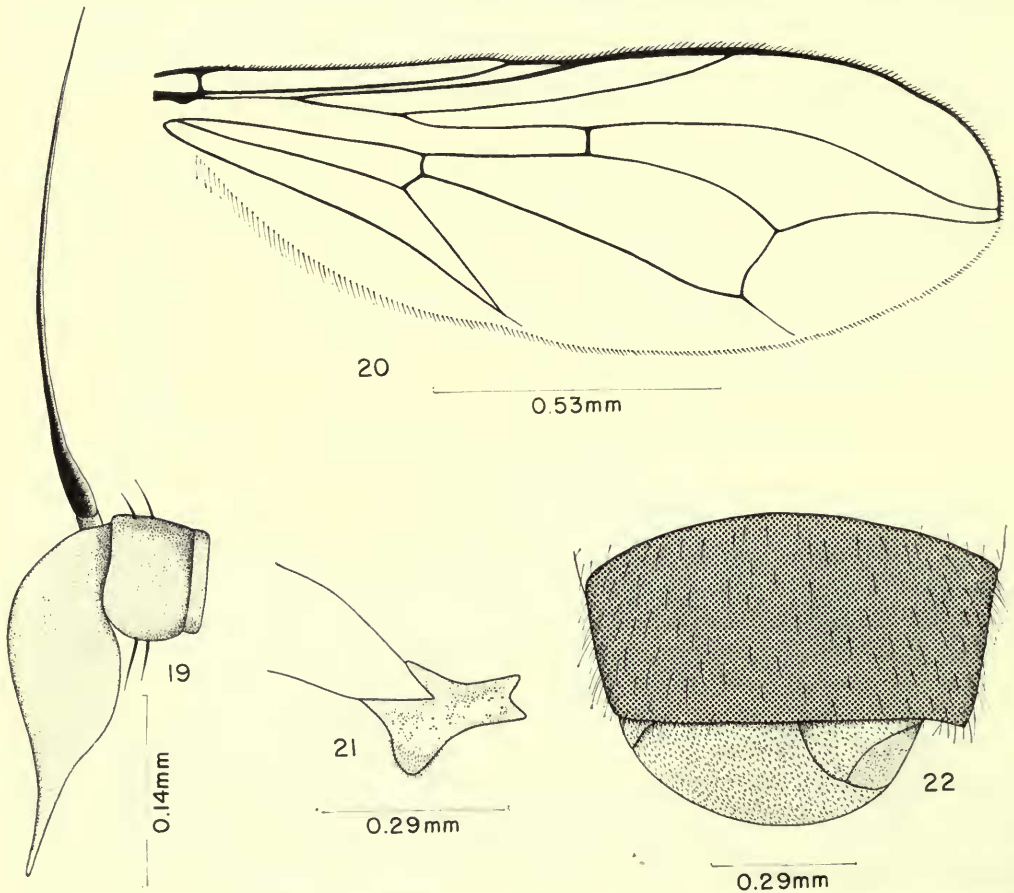
Pipunculus nitens Brunetti, 1912, *Rec. Indian Mus.* 7 : 492.

One ♂ specimen from E. NEPAL : Taplejung Distr., north of Sangu, dry grass above river bank, c. 5,000 ft, 5.i.1962 appears to belong to this species. From Brunetti's description of *nitens*, however, it is impossible to be sure of the identity of this species without studying the type. Also from the original description it would appear that *limpidipennis* Brunetti (1912 : 491) is the same as *nitens*. I see nothing in the original descriptions of these species which would differentiate them.

The species at hand is very close to *T. subvirescens* (Loew) and from external characters I see no way to differentiate these except by the shape of the development on the hind trochanter. In the specimen before me this is subacutely pointed (Text-fig. 21) rather than being flat topped as in *subvirescens*. It is possible that the specimen may be aberrant or that *nitens* may represent a subspecies of *subvirescens*.

A predominantly subshining blue-black species characterized by the symmetrical hypopygium (Text-fig. 22) and by the shape of the process on the hind trochanter (Text-fig. 21).

The compound eyes are joined on the front for a very short distance, approximately equal in length to four rows of eye facets. The upper portion of the front and the ocellar triangle are polished black, the lower front is silvery grey pubescent. The face is silvery grey pubescent, approximately equal in width to the lower portion of the front. The occiput is shining black, lightly brown pollinose on the upper portion, silvery grey on the lower two-thirds. The antenna is brown to black, the third segment is moderately acuminate (Text-fig. 19). The thorax is metallic black in ground colour, rather lightly brown pollinose on the dorsum, grey on the sides. The humeri are yellow. The halteres are yellow. The mesonotum is bare, except for a line of short, inconspicuous setae down each dorsocentral row, and for short, scattered setae on the anterior and posterior corners and also along the sides. The scutellum has a few short, inconspicuous hairs around the margin and scattered setae over the dorsum. The wings are entirely hyaline, the venation is typical of most *Tomosvaryella* (Text-fig. 20). The third costal section is just slightly more than half as long as the fourth and the *r-m* cross-vein is situated near the middle of cell 1st M_2 . The legs are predominantly black, the broad bases and narrow apices of the tibiae are yellow. The first three to four tarsal segments are yellow, the apical segment is brown. The front and middle femora are polished black on their anterior surfaces, opaque



FIGS. 19-22. *Tomosvaryella nitens* (Brunetti). 19. antenna; 20. wing; 21. hind trochanter of ♂; 22. ♂ genitalia, dorsal.

grey posteriorly. The hind femur is opaque grey on the anterior and dorsal surfaces, polished black on the posterior and ventral surfaces. Short ventral spines are present on the front and middle femora, these are represented by one row each of anteroventral and posteroventral hairs on the hind femur. Each front femur has a short but prominent black posteroventral seta near the base of the segment. The process on the hind trochanter is densely grey pubescent and is shaped as in Text-fig. 21. The abdomen is metallic blue-black, lightly dusted with brown pollen and rather thickly covered with short brown setae. The first tergum has a row of about six black hairs on each side. The abdomen is almost straight-sided as seen from direct dorsal view. The hypopygium is symmetrical, with a prominent depressed area on the right side (Text-fig. 22). As seen from above the hypopygium is approximately one-half as long as the fifth abdominal segment. The ventral aspects have not been studied.

Length : Body, 2.8 mm. ; wings, 3.2 mm. ; Brunetti gave the length as 2.0 mm.

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